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Sisal Experimental Station Report for the year 1937

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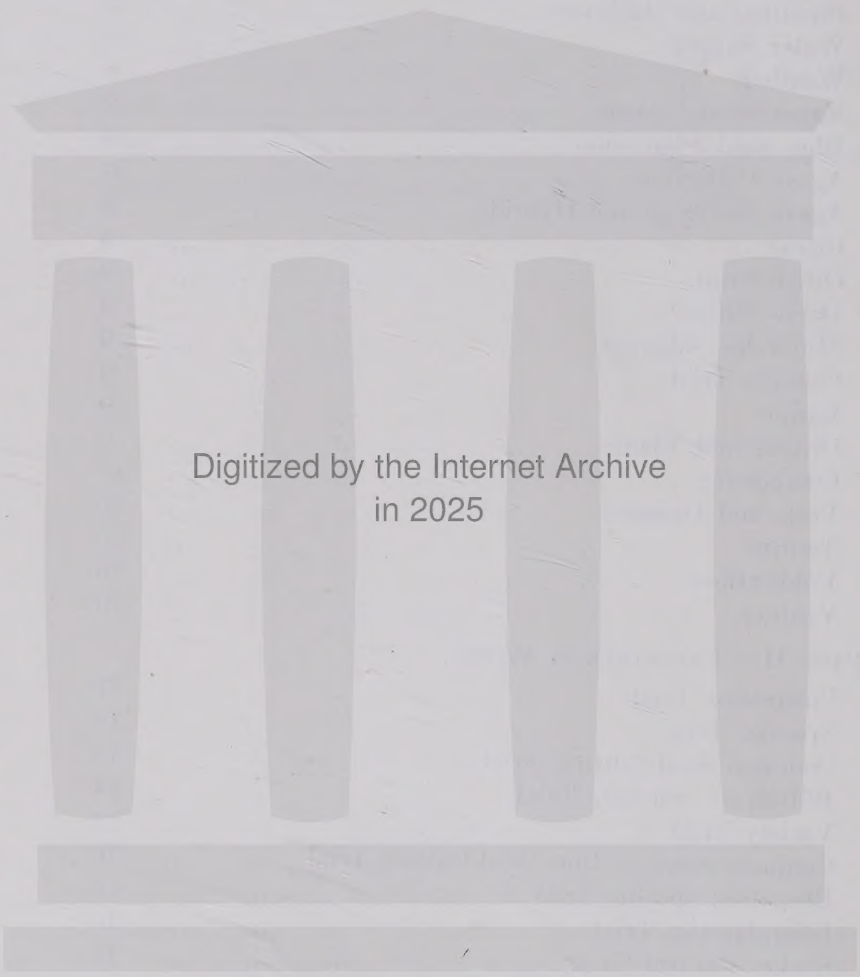

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Foreword

The third annual report of the Sisal Experimental Station is divided into two parts as formerly, the first dealing with the development and general activities of the station and the second reviewing the progress of the field trials planted last year and other experimental work with sisal.

SISAL EXPERIMENTAL STATION REPORT FOR THE YEAR 1937

PART I.—Staff.

1. *European.*—Mr G. W. Lock, Agricultural Officer, was in charge of the station except for the period 14th March to 7th September when he was absent on leave and was relieved by Mr R. B. Allnutt, Agricultural Officer. Mr H. A. B. Fowler, Agricultural Assistant, continued to act as assistant until he went on leave on the 28th October. Mr A. A. E. Weirich, Agricultural Assistant, arrived to take his place on the 22nd November.

2. *African.*—The present African staff comprises one clerk, four instructors trained in outside recording work, and four computers responsible for the compilation of growth records. About twenty thousand plants are being measured at monthly or bi-monthly intervals which makes a small clerical staff indispensible in order to cope with the mass of figures collected from the experiments.

In addition ten native probationers, mostly straight from school, are being trained in sisal and nursery work. A few lessons in elementary agriculture are given periodically.

A number of the better paid employees have opened accounts with the Post Office Savings Bank and are encouraged to save a proportion of their wages each month.

The small gang of selected labourers started last year has proved to be the most suitable form of labour for the station. These men are familiar with experimental methods and attend regularly. A small amount of casual labour is employed for less exacting work. There was a shortage of labour throughout the year.

Development of the Station.

Clearing.—Additional clearing of land has been carried out from time to time as the routine maintenance of the experimental areas permitted. Nearly ten hectares (approximately twenty-four acres) have been prepared in the north-eastern corner of the estate in readiness for the factory and labour camp which are to be on adjacent sites. The developed section of the station forms a fairly compact block in the southern portion. A permanent barbed wire fence has been erected around the trial grounds to exclude wild pigs. The fence is reinforced with a live thorn hedge.

4. *Buildings and Machinery.*—No new buildings were erected during the past year. The Sisal Board have approved drawings for the proposed factory building to house the single-drum "Solona" decorticator which has been ordered. It is intended to equip the factory with electric power taken from the power line running close by the site, and water will be pumped from the new dam. In collaboration with the Executive Engineer, Public Works Department, Tanga, plans were drawn up for a model labour camp consisting of twenty-six houses to accomodate sixty-four boys. Four houses will be detached units, eighteen semi-detached suitable for families, and four quarters to house bachelors. Four different types will be built. The foundations and walls will

be of permanent construction but trials will be made with roofing and flooring materials. The layout comprises four parallel lines of houses, the lines arrayed in two pairs with houses back to back each house having a separate compound, kitchen and latrine. The two pairs of lines will be linked at one end by a semi-circular row of four detached houses. In this form the native quarters may be regarded as a suitable nucleus for a large camp on estates. These plans have been passed by the Sisal Board and it is hoped to begin construction in the near future.

It is also proposed to erect a garage, tool and seed store near the present office.

In September delivery was taken of a new thirty-hundredweight lorry fitted with a body designed for the transport of sisal leaf.

5. *Water Supply.*—Several pits were sunk on the site of the proposed new earth dam to examine soil profiles as well as to find the underlying rock formation. The Public Works Department surveyed the site and prepared estimates. Construction will be undertaken next year.

The old dam held a fair quantity of water throughout last dry season despite continuous seepage. It filled to overflowing during the long rains and again in October. On each occasion water continued to flow over the spillway for about a fortnight afterwards. There is every reason to think that the new dam will conserve sufficient water for the needs of the station.

6. *Weather.*—The total rainfall for 1937 amounted to 1,406·4mm. (55·3 inches) which is the heaviest precipitation recorded so far. Rain fell on one hundred and forty-five days. Distribution was abnormal, the rainfall for the last three months exceeding that for the first seven months of the year.

The long rains began at the end of March continuing throughout April and May but were lighter than in the previous year. June and July were dry months. Noteworthy heavy rains fell during October amounting to 481mm.

Sisal in the experimental plots grew satisfactorily and was not seriously affected by the erratic nature of the rainfall.

7. *Experimental Areas.*—These have been maintained in good order. Clean weeding has been the rule as indicated by the progress of the Cultivation Trial. Extra areas were prepared for planting agave seedlings received from the Geneticist, Amani, testing bulbils of sisal seedlings raised at Amani which poled against common sisal in progeny rows, and bulbil and sucker nurseries for future requirements. No new field experiments were laid down, the intention being to wait until the present series of trials provide more guidance for the design of new experiments. Odd unusable corners of the trial grounds have been cover-cropped with *Calapogonium mucunoides*. Anti-soil erosion precautions have been taken on sloping land as well as in the manurial trials to localize soil wash.

8. *Blue Sisal Plantation.*—This was cut for the first time in November by arrangement with Messrs Consolidated Sisal Estates of East Africa, Ltd, who decorticated the leaf at their Ngomeni estate. The results are tabulated in part II of this report. During the year 72,550 suckers were distributed to estates in the Tanga Province. Since cutting the area has been weeded thoroughly.

9. *Agave Collection.*—Repeated annual plantings of species were made to provide as far as possible a future succession of poling plants for breeding work by the Geneticist, Amani. Other varieties of agaves received from Amani added to the collection during the year were *A. fourcroydes* var. *Ixtli*, *A. chloracantha*, *A. oblongata*, *A. chrysantha* and *A. toumeyana*. The collection at present

includes twenty-five different species of agave. *A. ingens* and *A. ingens* var. *picta* are very susceptible to weevil attack several plants having died.

10. *Agave Seedlings and Hybrids.*—The breeding of agaves is undertaken by the Geneticist at Amani, and seedling plants raised by him are sent down to Mlingano when they are large enough to transplant.

About three thousand agave seedlings and hybrids have been planted on the station. Bulbil plants of *Agave sisalana* seedlings received from Amani are being compared with common sisal in progeny rows.

Several hybrids of *A. amaniensis* × *A. angustifolia* and the reciprocal are making excellent progress showing superiority in rapidity of leaf production over common sisal. Soon it will be possible to examine their fibre characteristics. These plants are particularly interesting demonstrating the potentialities plant breeding holds for improving the sisal plant itself.

11. *Citrus.*—Considerable developments have been made in the citrus valley. Two hectares were planted last April with budded trees raised on the station of Triumph and Marsh's Seedless grapefruit, Mediterranean Sweet, Valencia and Zanzibar oranges. Weather conditions at the time of transplanting might have been better and the trees suffered during the dry period of June to August. Consequently a small proportion of supplying will be necessary next year. The well-established trees improved markedly as a result of the heavy small rains. The entire area is cover-cropped with velvet bean (*Mucuna nivea*) which has made a very vigorous cover suppressing weeds.

The citrus nurseries have been extended in preparation for more extensive propagation work next year. The beds are mulched with dry grass and rough lemon seedlings are used for stocks.

The sides of the citrus valley have contour hedges of khus-khus grass (*Vetiveria zizanoides*) and *Leucaena glauca* to counteract soil erosion. Indifferent main rains hindered the establishment of the contour hedges but they are now satisfactory.

12. *Other Fruits.*—The slopes of the southern end of the citrus valley, just below the buildings, have been planted with bananas and made ready for planting other fruit trees later on.

At the suggestion of Sir Frank Stockdale, inarched trees of the mango varieties Alphonse, Sundershaw, Mulgoba and Pairi were imported from India and planted in December. Some trees of the variety Julie from Amani have been planted also. In due course these varieties will be propagated.

13. *Derris Elliptica.*—The few plants of *Derris elliptica* planted last year have made fair progress and a number of cuttings were taken.

14. *Mundulea Suberosa.*—These have now attained the size of young trees ten feet high. Fertilizers have been applied and any effect upon the quality of the bark is being studied by the Biochemist, Amani.

15. *Cassava Trial.*—A trial in connection with the mosaic leaf curl disease of cassava was planted for the Plant Pathologist, Amani for the purpose of testing the rate of spread of mosaic disease under conditions (i) bare ground (ii) thick dry grass mulch (iii) dense cover crop. Both healthy and diseased stocks have been used. The trial is conducted by the Amani staff.

16. *Ramie.*—The ramie became more stunted after three cuttings and has not been entirely successful. Its cultivation has been discontinued except for two small representative plots of *B. utilis* and *B. nivea* which have been retained.

17. *Ornamental Plants.*—The nursery work includes propagation of ornamental plants and trees.

18. *Composting.*—A small amount of compost was manufactured during the year and used in the nurseries. Trials with composting sisal waste are due to be started shortly.

19. *Pests and Diseases.*—The sisal weevil (*Scyphophorus acupunctatus*) caused little damage to the cultivated species of agaves on the station though a constant watch was kept on this pest in the experiments. Certain of the ornamental species were particularly susceptible to weevil attack as well as several of the less vigorous agave seedlings.

The latter were also prone to sun-scorch. In August there was an outbreak of sun-scorch on young blue sisal but the damage did not spread and in many cases the symptoms subsequently disappeared.

20. *Touring.*—Owing to staff changes touring has been confined to the estates in the Tanga Province many of which were visited during the year.

21. *Publications.*—The quarterly notes of the station are circulated among sisal growers in Tanganyika by the Secretary, Tanganyika Sisal Growers' Association. They serve to keep producers informed of the progress of the experiments.

22. *Visitors.*—Sir Frank Stockdale, C.M.G., Agricultural Adviser to the Secretary of State for the Colonies, visited the station last March accompanied by the Honourable the Director of Agriculture. Other visitors during the year include the Honourable the Chief Secretary; The Provincial Commissioner, Tanga; the Director of Agriculture, Kenya; the Director of Agriculture, Nyasaland; the Director of Public Works, Tanganyika; Lady Lead; J. V. Gray, Esq.; H. Tanner, Esq.; G. Gaedhe, Esq.; C. R. M. Scholvinck, Esq.; Major H. G. Faulkner; H. Watkins, Esq.; Dr Hindorf; F. P. Saupe, Esq.; W. Downes, Esq.; Col. Maxwell, Kenya; V. Liversage, Esq., Nairobi; C. E. Gage, Esq., Lindi; J. S. Piggin, Esq., Lindi; O. Sanders, Esq., London; Messrs Hacquart and Brynaent, Belgian Congo; M. O. Brien, Esq., New Zealand Commissioner; H. Schmidt, Esq., Copenhagen; Dr W. Carter, Pineapple Experiment Station, Honolulu; A. G. Hill, Esq., Director of Amani; the Senior Agricultural Officer, Moshi; the Secretary, Tanganyika Sisal Growers' Association and members of the Amani staff.

23. The relationship between the station and the East African Agricultural Research Station continues to be a very close and valuable one, and assistance rendered by the Amani staff is gratefully acknowledged. The work which is being carried out on sisal by the Geneticist, Mr L. R. Doughty, deserves special mention; it has been particularly helpful in conducting trials at Mlingano.

Co-operation is maintained with Dr Gibson, Director of the Linen Industry Research Association, Lambeg, Northern Ireland. During my leave I was able to visit Lambeg and was introduced by Dr Gibson to the interesting research work on sisal utilization which he is carrying out besides visiting a large ropeworks. Visits were also made to Germany, Holland and Leeds in connection with sisal machinery and sisal cultivation.

PART II.—Experimental Work.

It is now twenty months ago since planting the field experiments began and in consequence the sisal is not yet ready for cutting. This has precluded any determinations of fibre yields. Up to the present we have been obliged to be content solely with growth records for judging the effect of various cultural methods upon sisal.

The growth of the sisal is measured monthly or bi-monthly by recording the number of new leaves produced and in addition the length of the last unfurled leaf for each recorded plant. At their best these growth measurements cannot give a complete picture of the reaction of the plants to the treatments applied and hence it is inadvisable to attach too much significance to such figures without the support of fibre yields.

Despite the limitations these growth records possess at the moment, their usefulness may become more evident later on. From the outset it should not be overlooked that a possibility exists of future yields being dependent upon vegetative development in the young stages, perhaps more so in the case of sisal than with fruiting crops. It is reasonable to think that the faculty of a sisal plant for yielding fibre is probably closely related to the number of cuttable leaves produced and leaf counts will be needed to show this. Likewise leaf length is indicative of leaf side which in turn provides an approximate index of the amount of fibre in the leaf. An unknown factor of importance is whether the total number of leaves a sisal plant is capable of producing before poling is inherently circumscribed or whether it can be influenced by environmental conditions. Should this characteristic of sisal eventually prove to be a variable one then such would clearly upset any foreshadowing of fibre yields based on growth records, however suggestive the latter may appear in the early stages. Thus prophecy is barred and patience is called for until yields are known in entirety.

Figures illustrating the progress of the trials on this station during the past year are given below with the reservation that growth records cannot be accepted as an adequate criterion for discriminating the true merits of any cultural treatment.

Cultivation Trial.

Layout : 6 × 6 Latin Square.
Planted : April 1936.

Analysis of Growth Records.

Treatments	Average number of new leaves produced per plant between 29/6/36 and (a) Dec. 1936	(b) Dec. 1937	Increase in number of new leaves during twelve months ending 6/12/37
Surface clean weeding	20·8	84·3	63·5
Clean weeding and deep cultivation ...	18·6	78·5	59·9
Cover crop (*Calapogonium mucunoides*)	17·2	64·2	47·0
Weeding twice annually	16·2	61·0	44·8
Cutlassing weeds	13·9	42·4	28·5
Uncontrolled weeds	12·2	31·3	19·1
Significant difference	1·37	4·3	3·22

No change has occurred in the order of the treatments according to leaf production since first determined a year ago. Significant differences still arise between all the treatments except between the cover crop and weeding twice annually; the differences have widened showing that the depressing effect of weed competition has become more marked with the passage of time.

The clean weeded plots have produced about three times as many new leaves during the year as the very weedy ones; and one and a half times as many as the plots weeded periodically. The latter treatment may be regarded as a control because the weed competition permitted corresponds to that often obtaining on estates in this locality.

Analysis of Growth Records.

Treatments	Average length of last unfurled leaf in centimetres on (a) Dec. 1936	(b) Dec. 1937	Increase in centimetres during year ending 6/12/37
Surface clean weeding	52·3	101·6	49·3
Clean weeding and deep cultivation ...	50·3	98·9	48·6
Weeding twice annually	48·6	84·5	35·9
Cover crop	48·4	83·5	35·1
Cutlassing weeds	48·1	75·6	27·5
Uncontrolled weeds	47·7	73·8	26·1
Significant difference	2·9	4·8	4·28

In the case of leaf length also the order of the treatments has remained unaltered since a year ago. No significant differences exist between the two clean weeding treatments; weeding twice annually and the cover crop; and cutlassing weeds and uncontrolled weeds, respectively although other comparisons are significant.

The clean weeded sisal is approaching the cutting stage as evinced by the length of the last unfurled leaf coupled with the number of cuttable leaves, namely those longer than sixty centimetres, which averaged seventy per plant early in December last.

In the very weedy plots where the sisal has suffered most competition not only has leaf production been restricted but leaf quality has been impaired. The rank weed growth causes the well-known deleterious effect of shade upon sisal represented by lanky flaccid leaves lacking in bloom and colour.

Deep cultivation brought about a slight setback to the sisal when the operation was first carried out in 1936 which has not been recovered yet. On the other hand latterly repeated cultivations do not appear to have checked the growth rate very much. Probably this can be explained by damage to roots being relatively more severe when the sisal was small than subsequently when its root system had become more extensive.

A significant and positive correlation ($r = +\cdot490$) was obtained between the average daily leaf increase of the clean weeded sisal and rainfall records over a period of seventeen months; a similar correlation for the very weedy plots was stronger ($r = +\cdot579$). These correlations point to the connection between sisal growth and rainfall, and suggest that the effect of weeds is mainly that of desiccating the upper layers of the soil rather than competition for plant

nutrients. Clean weeding is open to the objection that the soil is exposed to the sun and drying winds though it would seem that the loss of soil moisture is less than that resulting from the transpiration of the weeds. Measures against soil erosion are implied also with clean weeding.

An outcome of the clean weeding treatment is that the twentieth leaf and others opened out afterwards are sufficiently well-developed to warrant cutting when the time arrives shortly, whereas in the neglected sisal the fortieth leaf recently produced can hardly be described as good enough for cutting.

Spacing Trial.

Layout: Six randomized blocks of eight plots each.
Plot size is 120 sq. metres.
Planted: May 1936.

Analysis of Growth Records.

No. of plants per hectare	Average number of new leaves produced from 27/7/36 to 29/12/37 per plant	Average number of new leaves produced from 27/7/36 to 29/12/37 per plot of 120 sq. metres	Average length of last opened leaf on 29/12/37 in centimetres
10,000	66·3	7,961	91·5
6,666	70·7	5,660	98·3
6,410	73·7	5,532	95·7
5,000	77·7	4,664	95·7
4,166	78·1	3,906	96·3
3,333	80·5	3,222	101·1
2,500	83·6	2,509	101·0
1,666	82·5	1,650	103·4
Significant difference	1·9		3·0

Significant differences between the treatments did not begin to appear until about a year after planting, and then only between plots closely spaced in the row and those more widely spaced. The effect of plant-to-plant competition has tended to become more pronounced with the increasing size of the plants and is most evident in the densely planted plots.

At present there is a preponderance of leaf in the closely planted plots; this may diminish after the first cut and there is a likelihood that a large proportion may be of second grade quality.

Common Sisal Cutting Trial.

Layout: 7 × 7 Latin square, 25 recorded plants per plot.
Planted: April 1936.

This trial provides for testing seven systems of cutting sisal varying in frequency and severity. Cutting will begin in the near future. The sisal has been kept clean weeded and is forward for its age. Above all it is still very uniform, the recorded plants having a low coefficient of variability after removing positional effects, and demonstrates the advantages of grading bulbil planting material at the time of planting.

Even though the plants vary little, comparing the individual growth records for December 1936 and December 1937 respectively for three hundred plants in

this trial the following characteristics were found to be significantly and positively correlated :—

(i) Total number of new leaves produced up to December 1936, and
Total number of new leaves produced during the ensuing year ($r = +\cdot 559$).

(ii) Length of last opened leaf in December 1936, and
Length of last opened leaf a year later ($r = +\cdot 778$).

(iii) Length of last opened leaf in December 1936, and
Total number of new leaves produced up to December 1937 ($r = +\cdot 541$).

(iv) Length of last opened leaf in December 1936, and
Total number of cuttable leaves on the plant a year later ($r = +\cdot 406$).

(v) Length of last opened leaf in December 1937, and
Total number of leaves produced up to December 1937 ($r = +\cdot 576$).

(vi) Length of last opened leaf in December 1937, and
Total number of cuttable leaves on the plant in December 1937 ($r = +\cdot 675$).

(vii) Length of last opened leaf in December 1937, and
Average length of three lower cuttable leaves ($r = +\cdot 57$).

These correlations help to show the relationship between the development of sisal at the ages of eight months and twenty months respectively before cutting has commenced. As regards vegetative development plants which had made most headway up to December 1936 still tended to lead a year later. It is seen also that the length of the last opened leaf can be taken as a measure of the total number of the leaves actually on the plant and therefore may be used as a guide for deciding when to commence cutting for the first time.

Bulbils *vs.* Suckers Trial.

Layout : 6 × 6 Latin square with two subplots of fifteen plants each per plot.

Planted : June 1936.

Analysis of Growth Records.

	Average number of new leaves per plant produced between 30/7/36 and 24/12/37	Average length of last opened leaf on 24/12/37 in centimetres
Bulbils, planted shallowly	76·8	95·2
,, planted deeply	74·9	95·9
,, small, planted shallowly ...	70·8	85·8
Suckers, planted shallowly	65·5	91·2
,, planted deeply	62·3	92·4
,, small, planted shallowly ...	61·5	86·5
Significant difference	2·6	2·6
Treatments grouped.		
Bulbils	74·3	92·3
Suckers	63·1	90·0
Significant difference	1·4	1·4

	Average number of new leaves per plant produced between 30/7/36 and 24/12/37	Average length of last opened leaf on 24/12/37 in centimetres
Material planted shallowly	71·2	93·2
Material planted deeply	68·6	94·1
Significant difference	1·74	1·74
Plants untrimmed	71·2	94·9
Plants trimmed	66·1	87·5
Significant difference	1·35	1·38

Bulbils have made more rapid growth than suckers during the past year. Large plants planted shallowly are still more advanced than the small plants which were planted shallowly. Deep planting slightly retarded subsequent growth whereas trimming lower leaves and roots off the plants checked the growth rate.

It will be noted that any setback given to the sisal at the time of planting persists during the early stages.

Variety Trial.

Layout: Six randomized blocks of six plots each.
Planted: May 1936.

Analysis of Growth Records.

	Average number of new leaves produced per plant up to (a) Dec. 1936	(b) Dec. 1937	Average length of last unfurled leaf in centimetres on (a) Dec. 1936	(b) Dec. 1937
A. sisalana bulbils	20·4	83·8	58·5	105·7
A. sisalana suckers	15·5	73·7	55·0	97·0
A. amaniensis bulbils ...	17·7	69·2	73·2	115·4
A. amaniensis suckers ...	18·0	68·9	70·2	112·5
A. cantala suckers	14·3	81·8	52·8	85·2
A. fourcroydes bulbils ...	14·8	53·7	45·8	87·7
Significant difference ...	1·25	4·50	3·93	5·3

From the above figures it will be seen that bulbils of *A. sisalana* have made rather better progress during the year than suckers of the same species. The suckers originally came from an estate and therefore did not have the advantage of nursery treatment. Despite grading the sucker plants are not as uniform as the bulbil plants. On the other hand no significant difference occurs between bulbils and suckers of *A. amaniensis*; the suckers in this case came from a young and clean plantation.

Whilst *A. amaniensis* has grown considerably taller than *A. sisalana* it has not quite so many leaves per plant though its leaves are heavier by reason of their length. *A. cantala* is a rapid leaf producer but the leaf is thin, short and has the disadvantage of spiny margins. *A. fourcroydes* has made the slowest progress of all.

COMMON SISAL *vs.* BLUE SISAL CUTTING TRIAL.

Layout: Six randomized blocks of six plots each divided into three subplots of sixteen plants each.

Planted: June 1936.

Separate plots of both kinds of sisal will eventually be cut at the second, third and fourth year from planting in the field and thereafter three cutting cycles of six, twelve and eighteen months will be tried. These treatments have not yet been applied and no differences can be determined at present except between the two varieties:—

Analysis of Growth Records.

Variety	Average number of new leaves produced per plant between 1/6/36 and 24/12/37	Average length of last opened leaf on 24/12/37 in centimetres
Common sisal	61·7	88·3
Blue sisal	49·5	105·7
Significant difference ...	3·1	2·8

BLUE SISAL SPACING TRIAL.

Layout: 4×4 Latin square.

Planted: July 1936.

Analysis of Growth Records.

Density	Average number of new leaves produced per plant between 30/9/36 and 30/12/37	Length of last opened leaf on 30/12/37 in centimetres
5,000 plants per hectare	51·8	99·3
4,166 ,, ,, ,, ...	53·8	103·6
2,914 ,, ,, ,, ...	56·2	104·1
1,666 ,, ,, ,, ...	53·6	99·3
Significant difference	2·86	2·28

This trial is not sufficiently advanced yet to show very marked differences in growth resulting from the spacings used. The widest spaced plants curiously, have not developed so rapidly as those more closely planted.

INTERPLANTING TRIAL.

Layout: Eight randomized blocks of four plots each.

Planted: April 1936.

Analysis of Growth Records.

Treatments	Average number of new leaves produced per plant up to (a) 9/11/36	(b) 9/11/27	Average length of last opened leaf in centimetres on (a) 9/11/36	(b) 9/11/37
No cropping; clean weeding	17·4	77·6	51·6	98·3
Beans interplanted ...	17·7	77·1	51·5	97·6
Maize interplanted	16·7	71·0	52·6	95·4
Cotton interplanted ...	16·3	72·2	52·4	93·8
Significant difference ...	0·58	4·51	1·22	1·56

The crops interplanted in sisal for the second season fared badly and did not present serious competition for the sisal except the first sowing of maize. The slight check given to the sisal by maize and cotton last year persisted this year even during periods when the land was free of interplanted crops.

Sucker Control Trial.

Layout : Six randomized blocks of four plots each.
Planted : June 1936.

Sucker growth has only been left in one of the treatments; the others will not become operative for several years hence. In view of this no significant differences arise in the analysis of growth records.

Manurial Trials.

Dressings of artificial fertilizers supplying nitrogen, phosphate and potash, as well as lime, were repeated this year. The response of the sisal to the various treatments has been slow and at present is rather uncertain although (except the lime trial) some of the fertilized plots are better than the control (no fertilizers). Figures from the nitrogen trial will indicate the magnitude of the differences in growth.

Nitrogen Manurial Trial.

Treatments	Average number of new leaves produced per plant between 10/10/36 and 11/12/37	Average length of last opened leaf on 11/12/37 in centimetres
NP	85·1	104·7
NPK	84·1	105·6
NK	83·9	101·9
N	83·8	101·5
NL	82·7	99·6
Control (no fertilizers)	82·1	98·9
Significant difference	2·03	2·60

Other Investigational Work.

Estate Trials.—A large manurial trial in estate sisal was cut for the first time and decorticated with the help of Messrs Amboni Estates, Ltd. The yield figures gave negative results. A manurial trial in connection with banding disease is still in progress. A spacing trial in a dry locality will be ready for cutting shortly.

Cutting Trials.—The investigation into the fibre content of upper and lower leaves, as mentioned in the last annual report which dealt with the first cut, was carried out on sisal ready for the second and third cuts respectively. Details were given in *Quarterly Notes No. 6*. Although some of the upper leaves contained a little less fibre than the lower leaves in the second and third cuts (but not in the first cut) the differences were not large or consistent enough to point to any maturation stage in the leaf as it is gradually pushed down to the horizontal position by new leaves unfurling from the central spike. Such differences as were observable seem to be attributable to the effect of previous cuttings or season. These tests were carried out with the co-operation of O. Werner, Esq., Hale Plantations, Ltd.

Decortication Tests.—Several decortication tests on standard machines were made with the assistance of Messrs Amboni Estates, Ltd, and O. Werner, Esq., Hale Plantations, to whom our thanks are due. For each test uniform leaf was used. The results showed quite clearly that a large decorticator with a mechanical leaf feeding system is capable of decorticating uniformly, and therefore would be suitable for decorticating leaf from experimental plots. Partly owing to these findings it was decided to equip Mlingano with a single drum decorticator instead of raspadors.

Blue Sisal Plantation.—Full details of the yields from the first cut of the blue sisal plantation were given in *Quarterly Notes No. 7.* Allowing for pig damage the area yielded at the rate of 2·4 tons per hectare including a small area only eighteen months old. Fibre yields were as follows:—

Grade	Total quantity tons	Percentage
No. 1	11·675 ...	84·4
No. 2	·880 ...	6·4
No. 1A	·850 ...	6·1
Tow	·424 ...	3·1
	13·829 ...	100·0

Average extracted fibre percentage for the mature blue sisal was 2·985 per cent. Waste losses ran high at 22·8 per cent.

The fibre was of good length, as may be gathered from the proportion of number one grade, and colour was satisfactory. Decortication of the leaf butts was more difficult than with ordinary sisal. The fine nature of the fibre calls for careful handling in the brush-room. Bales have been shipped to Europe for spinner's tests and reports.

Messrs Consolidated Sisal Estates of East Africa, Ltd, provided the means for cutting and decortication of leaf from this plantation which is gratefully acknowledged. After cutting (leaving fifteen leaves per plant) it seemed that the spacing in the row might have been closer than 1·25 metres which probably would have enhanced the yield per hectare. The plantation was thirty-one months old when this first cut was taken.

Root Growth and Sun-scorch Observations.—The root growth of a sisal plant in an observation box has been examined periodically; the box has proved too small for the dense mat of roots which has developed. Measurements of sun-scorch patches on leaves have been taken regularly but the area of affected tissue has not spread very much since it first appeared.

Dimensions of sisal leaves are recorded monthly to determine if the size of the leaf alters at all as it drops from an upright position to the horizontal. A nursery of small suckers of both common and blue sisal was started in April; these will be compared with bulbil plants similarly raised to ascertain whether there is any inherent differences between bulbils and suckers.

General Remarks.

Although the field experiments cannot give any tangible results for a few years hence, it may be conceded that the present growth studies of young sisal under different cultural conditions are becoming more informative and may acquire greater significance in the future once fibre yields are known.

One feature of certain trials which will soon be a reality is the way sisal growth can be promoted so that the plants will be ready to bear a light first cutting in under two years from planting given soil and season such as has prevailed at Mlingano. Conversely it is observable from the growth records how any check to the sisal when young tends to persist as a handicap during the early stages, and if severe might easily lengthen the interval between planting and commencement of cutting, though whether gross yields will be affected remains to be ascertained.

Sisal Experimental Station,
Mlingano, P.O. Ngomeni, Tanga.
19th January 1938.

G. W. Lock
Agricultural Officer (Sisal)

Appendix

Rainfall Records.

Month	1936 Amount of rain (mm.)	1936 No. of days rain	1937 Amount of rain (mm.)	1937 No. of days rain
January	46·2	7	13·1	1
February	121·8	11	9·6	3
March	13·1	3	258·5	10
April	189·7	19	153·3	27
May	268·1	22	193·1	22
June	190·2	16	16·8	8
July	31·6	12	10·5	9
August	153·9	10	48·5	10
September	94·8	16	39·0	11
October	152·3	10	481·4	19
November	27·9	8	96·5	15
December	45·8	13	86·1	10
Totals	1,335·4	147	1,406·4	145